hirsute on the lower surface toward the ends, usually with a few hairs on the upper surface, the margins stiffly ciliate toward base; racemes commonly 2, sometimes 3, approximate (the common axis 5 to 20 mm. long), ascending, often somewhat recurved, 5 to 9 cm. long; rachis flexuous, 1 mm. wide, with a narrow winged margin, glabrous, the margin and midvein above scabrous; spikelets on minute flat pedicels, solitary, scarcely imbricate, 3 mm. long, 1.8 to 2 mm. wide, obovate-elliptic, glabrous; glume and sterile lemma equal, 5-nerved, the lemma slightly concave and sometimes faintly fluted; fruit slightly smaller than the spikelet, smooth and shining.

Type U. S. National Herbarium no. 1,535,768, collected on fine sandy and silty clay loam, near Beaumont, Jefferson County, Texas, September 8, 1932 by J. F. Combs.

This very distinct species belongs in the Notata group but is not closely allied to any of its five North American species.

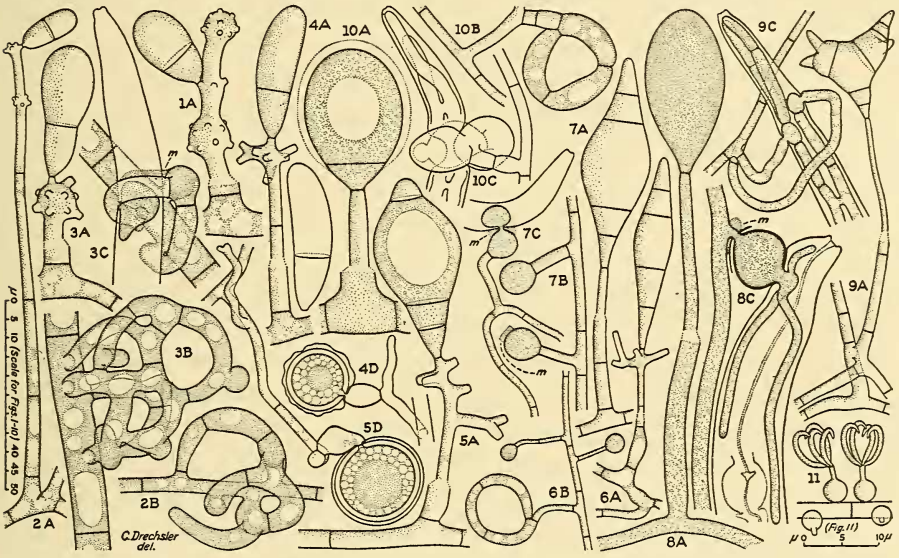
Mr. Combs writes that the species is found only on the Lake Charles soils, derived from sedimentary deposits in the Coastal Plain, and that it is an excellent forage grass, hence the specific name, *almum*, nourishing.

BOTANY.—*Morphological diversity among fungi capturing and destroying nematodes.*[1] CHARLES DRECHSLER, Bureau of Plant Industry.

Nematodes mostly of the genera *Rhabditis* and *Diplogaster* infesting agar plate cultures prepared from plantings of diseased rootlets or other decaying plant materials have been found destroyed often in such enormous numbers that the numerous heaped masses of their remains became visible to the naked eye as scabby superficial deposits. Among these fungi the one (Fig. 1, A) discussed by Zopf[2] as *Arthrobotrys oligospora* Fres. was often encountered. Three species evidently closely related to it and similarly having 1-septate conidia—one (Fig. 2, A) with the markedly smaller spores divided into somewhat less unequal cells and borne usually in one or two whorls on minute sterigmata; another (Fig. 3, A) bearing longer conidia with characteristically tapering basal cells, usually in a single terminal whorl likewise on sterigmata distributed over a recognizable enlargement; and a third (Fig. 4, A) with straight or slightly curved elongated ellipsoidal conidia borne in looser capitate arrangement on a terminal head of stubby branches—showed close similarity to *A. oligospora* also in manner of capture and killing. The animal was caught in one or more of the anastomosing hyphal loops (Figs. 2, B; 3, B) produced abundantly on the surface of the substratum by all

[1] Received February 10, 1933.
[2] Nova Acta K. Leop.-Carol. Deut. Acad. Naturf. **52**: 314–341. 1888.

these fungi and coated on their inner surfaces at least in large part with a transparent highly adhesive substance. Soon its integument was narrowly perforated by one or several processes arising usually from the inner face of the loop, and its internal structure fatally disrupted by the rapid intrusion of one or several inflated parts often very largely and sometimes completely occupying the body section involved (Fig. 3, C). Likewise in a species (Fig. 5, A) with 3-septate, obovoid spores borne in loose capitate arrangement on short subapical



Figs. 1–10.—Various nema-capturing fungi, each numeral denoting a separate species, and all species drawn with the aid of the camera lucida at the same magnification; ×500. A, Conidiophore (shown completely only in Fig. 2) with attached conidium of approximately average size, shape and condition with respect to septation. B, Organs of capture, either adhesive hyphal loops or adhesive knob-cells. C, Internal disruptive development of fungus, or its external constrictive swelling, Figs. 3, 7 and 8 showing condition at the time the animal's movements ceased. D, Intramatrical resting reproductive structures. *m*, Adhesive mucous substance. Fig. 11.—Portion of fertile branch of *Harposporium anguillulae*, ×1000.

branches as well as on the apex, large loops often in extensive anastomosing systems are formed, and the same mode of capture, penetration and internal disruption of the animal prevails. In a species (Fig. 6, A) with narrower, 4-septate, spindle-shaped conidia borne similarly in terminal, somewhat loose, branching capitate arrangement, the rather small loops are supplemented by globose cells borne on delicate lateral hyphal branches (Fig. 6, B). These cells, like the homologous but more robust structures (Fig. 7, B) of a closely related species (Fig. 7, A) that produces mostly solitary, 4-septate, broader, spindle-

shaped conidia, capture their prey by means of a strongly adhesive substance which becomes visible as a transparent disc-shaped cushion surrounding the point of contact with the struggling animal (Fig. 7, C). Penetration of the integument and production of an expanded part within ensues as in the case of the loops. It was undoubtedly such adhesive globose cells that Zopf interpreted, in excusable error, as conidia of his *Monosporidium repens*. Capture by adhesion, associated, however, with the formation by the fungus of a strongly inflated, thick-walled, yellow distension mostly outside the animal though with a smaller distal lobe protruding within (Fig. 8, C), is prevalent in a fungus having a large, non-septate, obovoid spore borne singly at the apex of a non-septate sporophore, the latter arising from a non-septate mycelium suggesting the mycelium of species of *Pythium* in the appearance of its protoplasmic contents (Fig. 8, A). Adhesion on hyphal tips, accompanied with rather little differentiation of vegetative parts both outside and inside of the animal (Fig. 9, C), appears to be effective in the somewhat more feebly predacious activity of a fungus bearing solitary spores, inverse pyramidal, distally twice bifurcate, usually 4 to 7 septate,—two transverse septa regularly occurring in the narrowing proximal part, two oblique ones regularly delimiting laterally a third or central cell, the remaining partitions being variously disposed in the divergent lobes (Fig. 9, A). A fungus (Fig. 10, A) bearing a large, solitary, obovoid, 1-septate conidium, the disproportionately large distal cell of which latter is often encased in a mucous coating, captures its prey in mostly intramatrical, vertically oriented hyphal loops (Fig. 10, B), killing it however, not by protrusion of a bulbous outgrowth within the animal's body, but by constriction effected through pronounced swelling of the three loop-cells, the swelling taking place more especially toward the center of the loop (Fig. 10, C).

In addition to the aerial colorless conidia that readily become detached from the rather tall (.1 to .5 mm.) colorless conidiophores present in all the nema-capturing fungi discussed, several species have been found to produce within the substratum yellow resting reproductive structures, usually terminally on single somewhat inflated cells,—the whole arrangements of parts, with the sometimes loosely enveloping outer membrane, curiously suggesting sexual apparatus of certain oomycetes. The seven fungi first referred to, which have been isolated, show in pure culture a correspondence in vegetative and sporulating habits that indicates a much closer natural relationship than distribution among such genera as *Arthrobotrys*, *Cephalo-*

thecium, Trichothecium, Dactylaria, and *Dactylella* might seem to imply.

The non-predacious parasite described in detail by Zopf as *Harposporium anguillulae* Lohde was also often found highly destructive to nemas in many agar cultures. In undisturbed and well developed material four of the crescentic spores were rather regularly seen attached to the tip of the slender cylindrical outgrowth arising from the spherical part sessile on the fertile branch, thus plausibly characterizing the flask-shaped structure as a basidium, and the fungus as a basidiomycete (Fig. 11).

ZOOLOGY.—*A bivulvar specimen of the nematode* Mononchus muscorum (*Dujardin*) *Bastian.*[1] GERTRUDE HENDERSON CASSIDY, Hawaiian Sugar Planters' Association. (Communicated by G. STEINER.)

Mononchus muscorum (Dujardin) Bastian 1865[2] is a species of wide geographical distribution; in 1930 specimens were found for the first time on the island of Maui, Territory of Hawaii.[3]

During that year considerable numbers of *Mononchus* had been collected from the islands of Oahu, Hawaii, Maui, and Kauai, and specimens of twelve species identified. For the most part observations had been restricted to the lower lying cultivated areas bearing sugar cane and pineapples, but later it was considered advisable to include some of the more remote forest lands and unfrequented mountainous ridges with a view to determining the possible indigenous nematode population of the Hawaiian Islands.

For this reason nemic collections were made at known elevations on the slopes of Haleakala, the highest mountain on the island of Maui. The ascent was made under the direction of the forest ranger and a route selected which is seldom if ever frequented save by an occasional pheasant hunter or by the inspecting forester.

The various collections present a wide range of nematode genera including several species of predacious mononchs,—among them the specimen of *M. muscorum* depicted which was found in loose cindery soil surrounding dandelion roots growing on the east side of the crater at an elevation of 8,000 feet. At this elevation practically all vegetative growth had ceased and only stunted grasses and occasional weeds

[1] Received October 13, 1932.

[2] BASTIAN, H. C. *Monograph on the Anguillulidae.* Trans. Linn. Soc. London. **25**: 103. 1865.

[3] CASSIDY, G. *Some Mononchs of Hawaii.* Hawaii. Planters' Rec. **35**: 330. 1931.